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Plantation Performance Averages for Black Spruce

by

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The average performance of black spruce (*Picea mariana* (Mill.) B.S.P.) in research plantations in Ontario has been graphically summarized in this note. The need for growth specifications for this species was observed by Reese (1975) at the Black Spruce Symposium in Thunder Bay in September 1975. This need is supplied in a preliminary and purely empirical way by the height and aggregate height performance records in Figure 1.

With the material presented previously for other species -- white spruce (*Picea glauca* (Moench) Voss), red pine (*Pinus resinosa* Ait.) and white pine (*P. strobus* L.) -- it is hoped that this information will assist forest managers to assess the success or failure of plantations in their area at any age up to 20 years (Mullin 1978a, b and c).

Figure 1 presents averages of survival percent, height and aggregate height from the control or untreated plots of research experiments. All plots contained over 500 trees, planted by local crews, with the usual procedures of the time, at a density of about 2950 trees per hectare (1200 trees per acre). For the purpose of this summary, plots with less than 50% survival at 5 years after planting were rejected, leaving 11 plantations of 3+0 stock and 8 plantations of 2+2 stock in the calculations. The curves and extensions were drawn by hand and the projections to 20 years are relevant only to stands in which no thinning has been done.

All that is required for comparative testing of any plantation against these empirical standards is an assessment of survival percentage and average height by any valid sampling procedure. In the absence of data on exact planting density, and hence absence of precise survival percentage, aggregate height can be obtained through counts of standing trees per hectare, and sampling of average height.

For the other species, it has been suggested than an achievement level of 75% of the respective performance averages might be considered as standard, below which immediate action would be required to treat or replace the plantation (Mullin 1978a and b). However, at the Black Spruce Symposium a minimum acceptable survival rate of 75% at 5 years after planting was suggested for this species (Fry 1975). As this cannot be achieved even half the time with 3+0 planting stock, the use of 2+2 planting stock only (possibly 1½ + 1½ if proved equivalent in current tests) is indicated. The achievement level of performance, to meet Fry's requirement, would be about 85% of the averages shown in Figure 1 for 2+2 stock.

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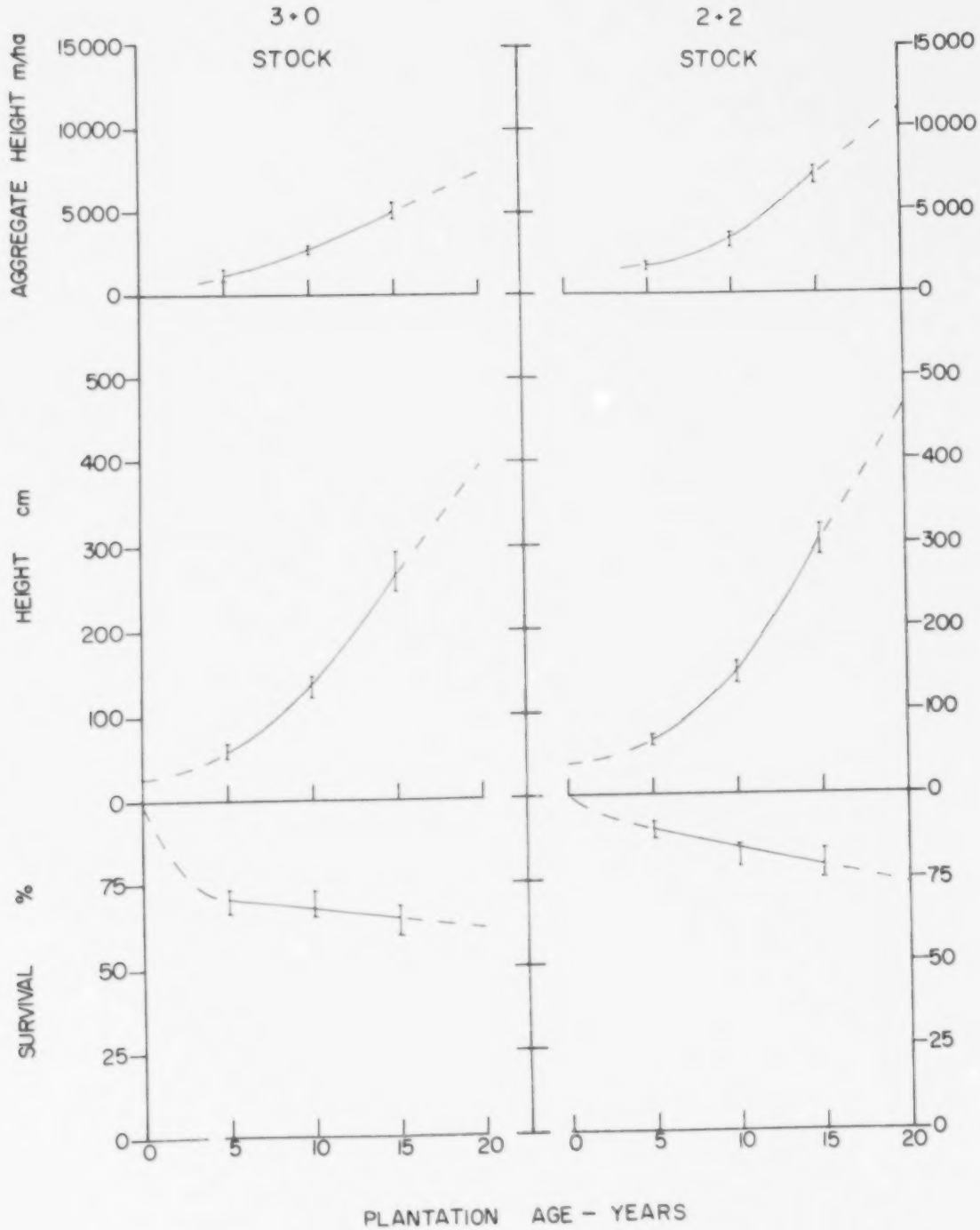

Figure 1 Plantation performance averages for 3+0 and 2+2 black spruce: survival (%), average height (cm) and aggregate height (m/ha).

References

FRY, R.D. 1975. Tree planting and stock quality--a view from the forest, p. 80-85. In Black spruce symposium. Can. Forest. Serv., Great Lakes Forest Res. Centre, Sault Ste. Marie, Ontario, Symp. Proc. O-P-4.

MULLIN, R.E. 1978a. Plantation performance averages for white spruce. Ont. Min. Natur. Resour., Forest Res. Note No. 15. 2 p.

MULLIN, R.E. 1978b. Plantation performance averages for red pine. Ont. Min. Natur. Resour., Forest Res. Note No. 16. 2 p.

MULLIN, R.E. 1978c. Plantation performance averages for white pine. Ont. Min. Natur. Resour., Forest Res. Note No. 18. 2 p.

REESE, K.H. 1975. Standards in the production and planting of black spruce, p. 86-89. In Black spruce symposium. Can. Forest. Serv., Great Lakes Forest Res. Centre, Sault Ste. Marie, Ontario, Symp. Proc. O-P-4.